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ABSTRACT

A carbonylation catalytic system comprises (A) a combination of (A1) a Group VIII metal source of Periodic Table of the Elements (e.g., palladium, palladium chloride) supported on a carrier, (A2) a ligand such as triphenylphosphine and (A3) an acid such as an alkyl-sulfonic acid, or (B) a combination of (B1) the Group VIII metal source except for palladium (e.g., a platinum compound), (B2) a ligand such as triphenylphosphine and (B3) an electron donative compound having an electron donability ΔvD of not less than 2 (for instance, an amine such as a heterocyclic tertiary amine). The catalytic system (B) may further comprise (B4) an acid such as methanesulfonic acid. In the presence of the catalytic system (A) or (B), an acetylenic or olefinic unsaturated compound is allowed to react with carbon monoxide and a nucleophilic compound having an active hydrogen such as water, an alcohol and a carboxylic acid in a liquid phase to give an unsaturated or saturated carboxylic acid or an ester thereof with high transformation rate and selectivity.